

## **IN THE SPECIFICATION**

Please replace Specification in whole with attached specification to clean up grammar errors.

## A ROTARY ENGINE USING TRADITIONAL PISTONS OF FLEXIBLE MOTION

### - SHIRWO SYSTEM -

Text Matter + 25 Drawings

#### INTRODUCTION

This is a brief research prescribing practical system for internal combustion engine provides better utility for fuel's energy by a design that could add more potential powers to engine output with perfect control for combustion intensities inside the engine to perform independently in harmonic effect, a system of different technologies associated in a simple economic discipline with wide options, to reduce the actual fuel consumption or to maximize the real potential fuel output.

It has been more than hundred years since that invention of Otto petrol internal combustion engine had appeared, still used until now to supply automotive powers. The fast progress in the world, the economical problems, the lack of energy, the increase of pollution on earth, make it necessary to develop more advanced automotive system, A compact engine that could convince the environmentalist organisations and the consumers ambitious to use a system depends on improved techniques to suit the computer age, in the main time providing methods to get use of those huge industries of regular weapons products, to be for civil efforts. Thus such advanced system in specifications, economic and has best utilisation for fuel energy with less pollution effect, is required to provide a promoting solution for the near future problems, *(referring to 'Kyoto' summit 1998 about industrial pollution)*.

A new environment-friendly generation of clever combustion engines is about to be appeared, it depends on a solidarity of many scientific concepts, some defining natural events or has been used in atmospheric flying missions, even beyond it in the space away from earth's gravity; all inside this compact automotive discipline.

It was the inventor's dream ten-years ago to become true at the same time when an industrial community like US Gov. had appealed on 1995 to find more advanced automotive system for the future. This powerful system is flexible in operation and harmonic in performance, an automotive engine, which could become so close to Man's orders as much as close to alive object, than just a machine.

**This** system utilises various scientific concepts participated in its missions of performance, it needs professional experts in I. C. automotive , mechanics, hydraulics,

aerodynamics and essential in physics knowledge, to be able to assess together the compound conclusions implied in the **criteria** of this power system.

Of course more diverse scientific researches in classified industrial laboratories would be needed later on for developing its various and wide options mathematically and practically (by using computer formatting). In order to reach the best commercial standards in using this system for different kinds of applications.

It's time to reconsider the way of using the potential energy of Petrol fuel in producing automotive energy for power engine equipment. In away to improve the energy of fuel combustion in engines, to make it in its maximum useful potential advantage to produce automotive power, by employing some natural universe concepts inside engine discipline, using advanced techniques depending on wide scientific knowledge to make these concepts employed under control inside the engine to be utilised to provide more output power for the fuel in the power engine.

Hopefully this could be a real useful automotive system to solve some future problems by a better way in utilising Petrol -God's generous gift to the mankind - the best powerful available cheap fuel material in the earth, in this economic design which is suitable for the future strict regulations and workable for computer age to fit the 21<sup>st</sup> century to be declared and invested for mankind peaceful purposes.

**This research :**

This brief research contains: description, design's principal (back ground), major changes, compositions & accessories, typical engine performance , conclusion of analysing potential ways of producing torque power, useful industrial & commercial characteristics, various design proposals, drawings contents, drawings(Figs) details, abstract and then the Claims, all with a set of 25 Drawings.

## **DESCRIPTION OF THE DRAWINGS**

**FIG No (Drawing No).**

**1/25 (1) : GENERAL SHAPE**

**2/25 (2) : TYPICAL POWER WHEEL UNIT IN HORIZONTAL SECTION.**

**3/25 (3) : TYPICAL POWER WHEEL UNIT IN VERTICAL SECTION.**

- 4/25 (4) : TYPICAL SPRING MODIFIED CROSS SECTION.**
- 5/25 (5) : TYPICAL THREE-POWER WHEEL UNITS SECTION PLAN**
- 6/25 (6) : TYPICAL POWER WHEEL UNIT OIL CANALS , ANALYSIS**
- 7/25 (7) : TYPICAL COOLING, LUBRICATION PAD**
- 8/25 (8) : TYPICAL PISTON ANALYSIS**
- 9/25 (9) : TYPICAL ENGINE PARTS**
- 10/25 (10): TYPICAL DIMENSION OF POWER WHEEL UNIT**
- 11/25 (11): PISTON PUSH-ARM MODIFICATION**
- 12/25 (12): DUAL CONNECTED PUSH-ARM OF PISTONS**
- 13/25 (13): VARIOUS PROPOSALS**
- 14/25 (14): VARIOUS CYLINDERS IN A WHEEL**
- 15/25.(15): VARIOUS PISTONS DIAMETERS IN ENGINE**
- 16/25 (16): VARIOUS WHEELS DIAMETRES IN ENGINE**
- 17/25 (17): FOUR-POWER WHEEL UNITS IN ENGINE**
- 18/25 (18): FORCES ANALYSIS IN THE ENGINE**
- 19/25 (19): TYPICAL ENGINE PERFORMANCE**
- 20/25 (20): A PROPOSAL FOR SEAL-MASS DESIGN**
- 21/25 (21): TYPICAL ENGINE ACCESSORIES, PROPOSAL 1**
- 22/25 (22): TYPICAL ENGINE ACCESSORIES, PROPOSAL 2**
- 23/25 (23):A TYPICAL ENGINE FOR FLYING EQT- VERTICAL CRANK  
SHAFT**
- 24/25 (24): A TYPICAL ENGINE FOR A WIDE WHEEL**
- 25/25 (25): ALL DETAILS OF THE ENGINE UNIT**

**DRAWINGS DETAILS - DECLARATIONS...( IN ALL THE DRAWINGS )**

1. Chamber (combustion room).
2. Case (engine Chassis).
3. Wheel (Power wheel unite ).
4. Wheel modified circumference (scratch resistant alloy ).
5. Metal spring (straight or inclined).
6. Crank (torque-crankshaft).
7. Piston push-arm (flexible shaft device).
8. Piston push-arm base. (cylinder base).
9. Spark plug.
10. Piston oil pump (built in with push-arm).
11. Oil tunnel (canal) for piston oil feeder.
12. Bolts for fixing seal base (in Case).
13. Pinion, gear ring to transfer rotation to other device (for ignition).
14. Solid steel ring for piston lock (in cylinder).
15. Canal for oil service.
16. Regulator adjustment for big seal mass.
17. Pad for oil cooling & lubrication.
18. Ring seals in the piston.
19. Big seal mass in Case (anti-gas).
20. Air-fuel mixture charging device (pre-compressed mix. feeding).
21. Air charging for exhaust stroke (on chamber).
22. Valve for air pipe( mechanical- control). / ( 22d - oil check valve).
23. Canal for water cooling service in Case.
24. Central canal for oil supply - in Crank
25. Engine base flexible holder.
26. Big circular sliding seal in Case-wheel (anti-gas, anti-oil).
27. Ball bearing device.
28. Oil usual pump (for engine).
29. Water pump.
30. Exhaust aerodynamic specific opening.
31. Cladding perforated hollow pipe(for piston oil pump).

32. Case main assembling bolts
33. Ignition distributor.
34. Middle oil tank (feeding tank for central oil canal).
35. Oil main tank ( the engine oil sump).
36. Oil pump intake.
37. Oil supply pipe.
38. Oil refill opening / (for atmospheric pressure equalizer & ventilation).
39. Oil lock washer.
40. Tightening ring (washer with pin).
41. Cylinder for piston in the wheel.
42. Piston in the wheel.

#### ..... DESCRIPTION .....

**S-H-I-R-W-O** : These letters define specific characteristics on the engine performance :

( Spherically Speed –Sustained / Harmonic-Hydraulic / Independent - Internal Combustion Intensities / Rotary - Reflected - Reactions / Wheel(s) / Operating ) .  
S. (System).

A new internal combustion compact power engine in a discipline providing smooth sliding mechanism with flexible performance using the fuel potential chemical energy for internal combustion in relation with additional effects due to employing techniques of using Natural Physical dynamic forces inside the engine to provide better output from the said fuel, a system consisting many theories working in association inside a simple mechanical discipline to utilise the maximum fuel energy for automotive power output, with minimum energy lost, in the meaning of reducing said fuel consumption related to power-weight ratio for engine output.

This system is designed to achieve the best mechanical way in transferring fuel combustion to automotive reaction, by using all known principles in one time with minimum power loss inside the engine, moreover it provides ways to use physical effects which appear due to elements dynamics inside the engine to be utilised for its

output benefit. This practical engineering design composing types of the recent combustion principles (those used separately to produce automotive power) the piston, rotary and turbine to perform all together as one compound system in this compact engine unit, and adding to it new principle of employing the inside physical dynamic reactions of engine's moving elements; all to provide maximum fuel utilisation in output. The system is a simple discipline using wheel(s) mounted on straight crank inside a case to rotate therein , the wheel(s) contains cylinder(s) for piston to move therein, the piston has a chamber defined as the space between piston top and the case internal wall with the cylinder bore surrounding the piston top, the piston is mounted inside the cylinder by free flexible push-arm connected it with cylinder base, to hold the piston and to transfer its flexible movement effects to the cylinder base then to the wheel containing it, with designed ways of isolating chambers, adapting services and conducting the parts in this discipline. This engine system produces torque power from Hydrocarbon combustion energy, by utilising the extension and pressure of emission gases after fuel combustion in closed chambers. In addition to that, this integral engine discipline will agitate and concentrate physical forces which appear inside the engine i.e. aerodynamic force of exhaust gases and physical dynamic effects of moving elements, to transfer these component forces as one resultant acting on the same target to apply more potential power to the combustion power of a said fuel. This system is designed in away to be flexible and harmonic in performance and could use any type of gasoline(octane)for fuel or Jet kerosene or even the gas fuel, dealing with fuel chemical energy in high efficient manner and adding to it - what could be said the indirect or invisible -inside physical powers (the resultant could be called the spherical sustained reaction). This system is using new technologies to arrange methods for employing natural physical concepts to be implemented inside the engine then invested practically for the benefit of the engine output .

#### **THE PRINCIPLE OF THIS SYSTEM DESIGN (Back Ground) :**

The conventional piston combustion engines depend on a set of piston cylinders fixed in engine case (chassis) using reciprocated push-arm between pistons and a zeg-

zag crank shaft connected with them in determined angles by mounting frictional minimising metal pads, transferring torque to the crank depending only on I. C. effect on pistons via push-arms in direct contact movement to produce power.

In fact those systems depend on fuel explosion but its effect should be always limited relatively with the constant piston displacement in cylinders -at all times - no matter how engine situation is, as their designs connecting all pistons with the crankshaft that is way their main problem is to provide precise ideal mixture control with its complications in order to keep equal displacements on all pistons always .

Those conventional engines depending on the direct reactions of fuel explosion-pressure power happened in the chambers only, depend on articulated mechanism neglecting other effect of physical forces that happen due to elements movements.

Although those engines have high rate of fuel power loss inside because of their machinery, appeared by the meaning of bad side-effects as friction, heat, vibration, noise ..etc. , causing a loss in part of fuel output in these engines; there is still no conventional engine design tries to concentrate the physical dynamic forces which could happen inside automotive engine after fuel combustion mission to use them positively in the engine output.

This new design is seated in a discipline to use potential power of fuel combustion occurred inside pistons chambers as direct contact on its pistons with ability of flexible displacements (not constant displacement), to transfer any range of fuel power, besides employing natural physical concepts inside the engine by a design devolving its elements to agitate then deliberate these concepts, to have their effects acting consecutively positively to provide effective physical potential influenced forces to increase the final engine output.

**The effective physical resultant power** (at a typical mod) due to reactions of :

1. Natural elastic characteristic of elements (elasticity of push-arm and gases).
2. Natural aerodynamic force of gases by the potential effect of exhaust gases.
3. Natural centrifugal potential power of rotating parts (appears at high speed).

This system arranging ways of utilising physical forces appeared consequently due to fuel chemical combustion energy inside this compact internal combustion engine, in the meaning of making these reactions working for the benefit of fuel output, by



concentrating the physical dynamic effects of inside elements movements instead of losing them as a lost energy inside the engine(as in conventional engines). This design is seated to employ and utilises natural physical concepts by making them appeared within the inside element movements in away to use the reactions as components acting positively in producing spherical effected resultant on the same target of fuel to apply additional torque on the straight crank of this engine, to magnify said fuel combustion power in output, in relations to the engine design and/or speed and load situations. This new compound concept is working in association with the fuel combustion inside this integral mechanism engine with its easily controlling ways; will increase the said fuel output or reduces said fuel consumption for any application.

The system mechanism will transfer all physical powers occurred inside engine to a kind of spherical resultant added to fuel combustion which already will be transferred to produce final torque output inside this system in a way keeping minimum energy (i.e. combustion power) lost inside this engine due to it's simple machinery (recent systems have loss rate of 15-40% due to their machinery as friction, heat & noise) which will be affected on the power-weight ratio in out put . This system is dealing with almost total potential fuel combustion's energy to be transferred to torque power, in a discipline providing perfect adiabatic efficiency .

The system is investing speed as a physical factor to reduce its fuel consumption.

The main seen achievement on this power system was in existing independent power units in a flexible engine that any part could bear different ranges of fuel power or even stop without disturbing the engine mechanical efficiency keeping harmonic performance with its ability to have automatic control for engine parts.

This is a **system of** any piston (or group) can work independently maintaining smooth engine performance without disturbing its efficiency to be as **auto-power** engine unit for various applications. a system utilising the inside-engine potential physical powers for the benefit of engine output and could counter said fuel consumption in highly speed. The conclusions on this system would observe many good characteristics such like: better output performance, less fuel consumption, automatic power, a built-in pollution treatment, computer control for the engine activities, the long duration for easy maintenance with variety of design proposals,

All these could be found in this simple fabricated compact engine system.

## **THE MECHANICAL COMPOSITIONS & ACCESSORIES OF THIS DISCIPLINE**

Compositions as per the enclosure typical drawings of :-

An Engine of three wheel units, of 2 pistons in each wheel using Gasoline :

1./ Out side Case (the engine body chassis) a metal cylindrical or octagonal shape (or as the drawings) with a diameter of 330-380 mm in horizontal-position on crank and approx. length (in drawings) of 550-650 mm has a large cylindrical cavity of 301 mm. Contains trenches for seals, tunnels for oil, water and places for valves with special exhaust opening, design & assembling requirements may divide it in parts upper and lower or more, and could permit to cast it in two layers of different alloys with trench's & tunnels.(Det. 2 , Fig : 2/25 & 3/25, 4/25)

2./ The crank (as main crank shaft) a torque output shaft is a straight solid steel iron, placed on the horizontal central line of the engine along the Case length and extended more, its diameter 25 mm-50 mm .The connecting points with the Case by ball bearings, which allow it to rotate only on its centre line. It contains central oil tunnel in its centre line, contains holes for linking oil feeding the rotating parts. Its surface geared (grooved) to interlock, trinket with the rotating parts to move coinciding all together as one system. (Det. 6, Fig : 2/25 & 4/25)

3./ Power wheel unit (flywheel unit) a metal wheel (3 in the drawings) is a solid strong light alloy wheel, a diameter of 300 mm and a width of 100-120 mm with circular circumference strengthen by scratch-resistant alloy, contains (here) two cylinders(for piston) with an outwardly opening placed in centre-side in opposite direction perpendicular to the wheel axis, each with smooth internal surface bore and diameter (here) 80 mm and length of 120-180 mm its central long axis making angle on wheel tangent larger than 45 degree . A piston placed to move in each cylinder adapted with its base, this has two small oil stores (sumps) one which receives oil by tunnel linked with central supply tunnel (canal) in crank for intake oil store to feed piston via piston-arm. Other for outlet oil store receives oil via piston-arm then to dispose it by a tunnel into wheel side. The feeding intake oil store kept in a full mod always, from canal linked to centre of the wheel within Crank oil tunnel. If required a

specific hole with outlet oil store. There are two washers around the crank on the two sides of each wheel for oil lock. There are two edge trenches in the circular circumference face of the wheel fixing a pair of two sides circular wheel gas-oil-slider seals. The number of these wheels the diameter and cylinders depend on the design and output ability of the engine applications. The direction of the cylinders centre line in a wheel differs from a nearby other wheel's cylinder in a known angle that could be found from dividing  $360^\circ$  by the numbers of the total cylinders in performance for the engine. The crank may be geared with wheel according to the wheel numbers for easily angler assembling that starts with all rotating parts in the relevant required angles then ball bearings particularly i.e. all rotating parts to be geared on the crank, by pressing them exactly at the designed angles before fixing the crank in the Case position. The manufacturing of power wheels units would be done by casting alloys with modified geared hole to interlock with crank, drilling oil tunnels, trenched on edges, a smoothing circumference and cylinders bore for pistons these with Case tunnels design would be standard mass production lines for proposals. (Det. 3, 41 Fig 2/25 & 5/25).

4./ The pistons: each one is from high resistant light disk of solid metal alloy, fixed inside the cylinder with 20-35 mm thickness nearly the same cylinder bore. It contains grooves on its circular wall for seals of gas and oil. There are two middle tunnels oil inlet and outlet inside suitable in linking the build-in oil pump on push-arm device from top end with piston, other smaller radial tunnels linked separately with each of these two middle tunnel horizontally to piston circular edge ( to oil gap)to cool piston and to distribute oil to piston wall contacting cylinder wall. A special lubricating seal or two in the oil gap on piston wall to uniform the lubrication on piston circumference wall with cylinder wall, for good slipping movement, minimising friction and heat for the main anti gas and oil seals while piston in movement. The piston is connected by washer-bolts with its solid bearing base plate that capping the flexible push-arm beneath piston. A solid steel ring at the top of the cylinder wall fixed in a groove to lock the piston in the cylinder if required, A suitable curved top capping piston face is required to provide a suitable chamber shape, manufacturing of piston by costing alloy with designed tunnels, grooves and seals ..etc. (Det. 7, 41,42 Fig 4/25 & 8/25).

5./ The flexible piston push-arm is two pair of stainless steel pipes slipping inside each other (or 1 pair) fixed vertically on cylinder base by two washer-bolts. A metal compression spring (straight or inclined) around or a built-in with the push-arm body, is reinforcing the push-arm in which its job is to maintain a linear piston's movement, it is designed to work freely as an elastic resistance for plant reactions (capabilities) for each proposal depending on engine data, it connects the piston and wheel at the cylinder base for linear variable designed displacement distances inside the cylinder cavity, without being guided or guarded by essential mechanical cam shaft in the engine, it could be in gas or liquid hydraulic device working as elastic resistance i.e. a similar to devices used in automatic re-fill system in fast canons,( Det. 8, Fig 4/25, 8/25 & 11/25).

6./ The oil pump for piston,(piston's private oil pump) is made from a sliding pair of pipes each of small stainless steel pipes slides in each other contains inside tunnel for oil, consists one way oil valve (check valve) in each inlet, or in opposite direction (a valve, using solid small ball locked in a longer size chamber of a curved end as a shape of the ball's half spherical shape with a smaller opening and other opening of many small holes to let the oil flows in one direction according to piston movement).To act as simple rod (shaft) pump due to the piston movement (with push-arm),sucking oil from the main oil canal in Crank via the inlet oil sump in the cylinder base, supplying oil to the piston then disposes it to wheel side-wall. A pump of two pair with opposite flow mounted inside the same push-arm device as in drawings.( Det. 10, Fig 4/25 & 8/25).

7./ The cooling & oil pads: each one is of light alloy plate of 10-30 mm thickness circular shape geared with the Crank attaching each wheel side-wall has radial trenches, (i.e. grooves) facing the wheel side wall, starting from central zone(pad sump) to the edge outwardly, coincided on wheel has about the same diameter and to act as a centrifugal pump (turbine), an inlet hole in the central linking oil from crank central canal via crank outlet which coincided with to feed oil to pad, then oil is distributed via grooves on wheel walls ,cooling wheel side-walls then disposed to the circular edge then to outsider at top portion of Case to oil service tunnels, (an air opening in ceiling of main oil tank is provided), the pad contains at its last circular

modified smooth edge, lower (or higher) zone(s) in certain places against its relevant chambers, for controlling the mechanism of slipping bar timing mechanism for the engine feeding valves as rotates with the crank against the chambers in the right time, kept moisturised by oil always, providing independent mechanism feeding for each wheel. Its other duty is to provide adiabatic efficiency,( Det. 17, Fig: 3/25 & 7/25).

8./ The radian seal masses (anti-gas), fixed in the Case: each from metal alloy (or hard anti-heat plastic or carbon combination) designed according to its work, which is the anti-gas seal attached the wheel wide circumference face in coaxial to the Case. The principle of these radian seals by contacting wheel circumference and keep on sliding on it, attaching the two circular wheel edge seals (the Case part) at wheel sides to provide a closed situation for any chamber in that portion to keep constant mod (stroke) in that chamber independently for each wheel i.e. preventing gases of chamber from penetrating while its wheel rotating. A right depth fixed from outside on the case by a special locked washer and each could be adjustable for contacting (attachment) with the face of wheel by a mechanical control spring regulator or (automatic thermal regulator). For a metal alloy it could be designed in a special way using linear metal seals, fixed on a base to provide a mass of seal in that portion, with various technique methods of oil services using the advantage of a one way rotation of the wheels and oil discharge keeping on flow in the Case during engine work. ( Fig 20/25 ) .

A relation with rotating direction and existing of special small inclined trenches on the wheel surface in the right places (or on attached pin-mass unite) with automatic opening for oil inlet and outlet holes. This could be applied with timing pins in the rotating parts. Using the advantage of one way rotation monitoring oil discharge from Case (or on wheel side phase) starting before entrance of the seal and disposes, while wheel rotates at a duration enough to lubricate attached zone particularly. This could be guarded with spring solid balls in specific place with each mass with a timing system controlled by edge of one side pad of each wheel,(or the wheel it self ) . Another way by applying holes in the circular anti-gas seal system, the special timing controlled opening system depends on one way rotation, using circular interlocked parts with holes at these seals. There are special holes on each blade ring that opened

across as one hole when seal blades meeting all in one fixed point(s) to set across opening hole for oil feeder from Case to these seal masses at required places. The direction of rotation and trenches in zone of wheel surface will collect the oil drops rapidly to the inlet holes (automatically opened) by specific techniques on the circular seals which fixed on the wheel edges before gases attend to reach the seal mass, from the coming chamber and before even the chamber reaches the seal position, maintaining surface in a good slipper. However the gases pressure direction may be used to dispose the oil in the right time. **The number** of these seals 3 to 4 for each ignition's duration and the radian distance between each one is less than the net radian distance between wheel chambers as the distance of specified attached surface, in any way providing various lubrication technique depending on the expert of industrial laboratories.

**The working principle** of these seals in their designed positions around the wheel is to maintain and to transport the locked-closed situation of chamber(s) i.e. keeping same status of mod in chamber ; while the wheel in rotation.

These seal masses are in three types of jobs (to work in relative to) :

No, 1 for one way anti-gas of air-fuel mixture; before starting the feeding operation on chamber and the place directly after pure air-valve in the Case.

No, 2 for two sides anti-gas, a side for the zone of charging air-fuel mixture, other side for gases of chamber after combustion, a place before power stroke.

No, 3 for anti-gas of the combustion gases at a place before exhaust stroke starting penetration from exhaust opening with particular specification .

**The essential radian distances between seal masses shown in ( Fig -10/25) .**

The size of any seal mass could be designed on bigger bas in order to allow a piston's maintenance preparation from the Case via this opening ,i.e. without open the engine Case to simplify any piston maintenance and push-arm device (also seal No, 3 could be repeated), (Det. 19, Fig 4/25 & 5/25 & 10/25 & 20/25).

9./ The circular anti-gas seals(wheel-case-slider, seals) on the two side's edge of each wheel's circumference, designed as required, a suggestion of suitable two or three stainless steel blade rings mass fixed in specific grooves in the wheel and/or with a part fixed in Case and other in the wheel. To interlock together when fixing all parts of

the engine, as separate pair of ring pieces fixed in Case, other ring fixed on operating wheel. The seals components would form together a tighten and a sliding device to protect the chambers from any penetration of combustion gases (and maintaining the required closed chamber for all mod of mixture). They could be lubricated with special holes in the right place where is no longer pressure on it, (i.e. end of exhaust opening) or using a self-lubrication seals or as industrial design , (Det. 26, Fig 2/25 & 3/25).

10./ The usual oil pump (and subsidiaries) , which is fixed in the front end of engine (or else). Connected with the crank to transfer oil from lower store oil tank , that receives oil flow coming from Case end, to the upper(middle) oil tank which discharges the intake of the main tunnel in the central crank. In which it has its winging (impeller) parts, in a shape that could direct the flow of oil sucked by tunnel's inlet holes in crank which suck it when rotates to discharge it to pads or pistons in each wheel by relevant holes outlets depending on the Centrifugal concept for each part. These outlets holes to the engine parts in the crank are in a specific design for their opening diameter depending on its relevant distance from main oil supply (Det. 24, 28 Fig 2a/25). The trenches in each pad i.e. grooves will be filled with oil, feeding from Crank holes flowing due to engine crank ration directed outwardly from centre. By centrifugal energy depending on parts-diameter due to its rotation. The grooves in a way contacting side-walls around each power wheel unit, for cooling as for Adiabatic. To provide perfect enthalpy system for each power wheel unit. The oil flow will reduce the heat of cylinders after fuel combustion. The pistons get their lubrication oil with the same principle, from a small tank (sump) in the base of each cylinder as intake store. That will be refilled always (if required by specific opening between the inlet and outlet stores with excess length of its intake rod pump tunnel). The demand of lubrication oil for each piston will be supplied as its movement need. The piston will take sufficient lubrication oil by its lubrication pump fixed in its push-arm that sucks oil with any little movement ,supplying the piston needs. Then flowing and directed out side piston by out flow tunnel to outlet sump ,then far from wheel centre to wheel side wall .Then disposes it in the pad zone to be directed to Case by

the same Centrifugal concept. The oil grooves and outlets for each pad to the Case as per the design. (Det. 10,11,15,17,28 Fig 2/25,3/25).

11./ The valves of air-fuel mixture and pure-air, air pipe-valves: are of same similar shape with mechanical control on the case. Each is in a separated short pipe device contains valve of a triangular with a wide back opposite to the air pressure supply direction. A triangular or curved shape against each wheel circumference in the case opposite to a same smaller graded shape opening. It is guarded by a spring. The place is in Case wall in a sufficient distance before firing zone for feeding chambers directed at central of the wheel circumference surface and to be opened at the right time against the chambers. They are controlled by the rotation of cooling pad(s) in a side of each power wheel. A simple mechanical elastic rod system connected within the cooling pad modified edge. There is a small smooth roller on rod end that (which is oil saturated) attaching the pad differential edge for timing the opening. By the meaning of lower (or upper) zones on the pad edge using this mechanism to transport and controls the opening movement to valves. (Det. 20, 21, 22, Fig 4/25 & 7/25).

The air-fuel mixture valve is to supply and feeding the air-fuel mix to a chamber. The pure-air valve is to puff the air to a chamber while still opened for cooling and expelling the exhaust gases from chamber for air exchanging mission.

The two valves in each wheel charged consecutively with pressured air by one device into their pipes from the same resource i.e. pressured air cylinder or centrifugal turbine powered by compressor or by engine rotation as it needs.

The principle of distributing the air between the two pipes for chambers, its differential angles (i.e. different timing), maintaining the required pressure for both air-fuel mixture and puffing on a chamber(or adjusted) at various speeds. The controlling requirement done by using outlet opening regulator of pressure release for main air supply(i.e. a reducing of that opening in higher speed means more pressure to engine) by using this before air enters the two pipes. The fuel will be splashed at exact mixture or various rate (as required) to charge the pre-compressed air directed to ignition with fuel in order to supply the chambers with fuel mixture before firing it inside chambers in fire strokes.



The fuel splashed could be done by a simple spraying device of a needle valve(s) or a simple sub- carburettor or by mechanical or electrical computerised system as indirect injection as pre-mixed air-fuel mixture in feeding engine or in sub-store for each chamber or direct injection at feeding zone on the wheel .

- 12./ The ball-bearings fixed in engine Case for holding the Crank by connecting it with Case from two end sides or more , (Det. 27 Fig 2/25 & 3/25).
- 13./ Water pump is as known in the front side of engine (or out of engine) with its outer radiator and pipes, with Case water cooling system tunnels (canals) to cool the returning hot oil and all engine Case. (Det. 23 Fig 2/25, 3/25). The air cooling system could be used instead of water with required tunnels or wings on the Case reinforced by air turbine to discharge air towards the Case.
- 14./ The exhaust opening is in the Case for each wheel : starting with a small graded increasing in opening with direction of rotation in a special aerodynamic angles ,meaning specific wings designed in the outlet of exhaust pipe in order to make the escaped gases at exhaust stroke take penetration position in a perfect way to produce a potential aerodynamic reaction on the wheel to act on the same direction of rotation by using escaping balloon concept .

The principle used here is to reverse the flying principle which utilising the fast air produced by plane fan to produce fast air turbulence on the air-plane wings to fly. In this design an assumption of a fixed fan (the exhaust specific opening) will be under fast air reaction (the exhaust gases, under its pressure and due to piston elastic depressed push-arm). The wheel is free to move (as air plane) i.e. wheel will be under reaction of an excess potential power to be rotated, assuming Case moved in relation to wheel put really the wheel moves, in reversing situation. This specific opening connected strongly with the case and exhaust pipe for each wheel then connected with the main exhaust pipe and could be moveable mechanically for changing its specification and angle depending on various calculations of engine data. (Det. 30, Fig 4/25).

- 15./ Ignition distributor as known, put any contact point has two contact points against each other for each wheel on the circular distributor, as the number of pistons in each power wheel units (depends on piston/cylinder No i.e. a triple in equal angle if a wheel

has three cylinders and so on ) . Using the same angle distribution for the pistons in whole wheels each one connected by one cable to its spark plug. The rotating conductor could be (here) faced each contact point twice per one cycle to spark two chambers every one cycle. (Det. 33 Fig 3/25). The ignition distributor could be placed and mounted in a suitable place to rotate by pinion device with the required relation of engine Crank rotation.

For engine of one large wheel with many pistons (cylinders), by using usual one contact point, with the same angle distribution, using one cable for each plug as two for dual ignition and so on , and could be used easily.

#### **16./ The accessories & sub devices :**

A cylinder stores relative compressed air with a compressor pump for recharging working with the engine rotation by a belt, to feed the engine with pre-compressed air. If a compressor in a vehicle could pump its tyre with the required pressure, why not using this method to charge pre-compressed mixture to this advanced compact engine. A centrifugal turbine fan connected directly with Crank could be used to supply the pressured air to this cylinder. This **cylinder** should have a sufficient air pressure before the first engine performance. The charging air supplement to both air-fuel mix and pure air for the chambers, the types of air temperature could be controlled. A mechanical and/or electrical controlling device for air pressure, connected with the accelerator pedal of the driver cabin. A modified turbo charger may be used instead which is depending on pre-heated and compressed by exhaust gases speed and heat but it may not work in a same perfect efficiency for this system which needs pre-compressed mixture.

The fuel spray injection device instrument to splash it in the compressed air using the simple natural spray principle on a liquid (i.e. the acclimatisation), depending on volatile of the opening and the specific density of fuel. This is the indirect injection way of engine charging of air while still in its way to chambers. Maintaining idle (very slow engine workability) by electric needle valves works with ignition by electric device. In this way any kind of fuel octane could be used since the flexible push-arms

are used also. A mechanical or electrical device system can be used as one unit for all chambers requirements since it is using same air pressure controlled by a simple accelerator pedal from driver cabin.

A separate pipe-opening regulator for fuel-mix valves in each wheel unit requirement, is in using the controlling system for automatic engine (or using independent fuel injection on supplying pipe or a store in each feeding valve), (or using direct chamber fuel injection with its device for each wheel, fixed in the case, as this could be more complicated devices connecting on the case).

The charging air could be pre-heated using a device with electrical heater or utilising the exhaust emission heat by attached device within the exhaust pipes.

The charging compressed air pipes should bear the maximum required pressure for engine application with a safety factor. (Fig 21/25 & 22/25 & 23/25)

17./ The assembling method (compositions set up) is starting with the main crank mounting on its all ready wheels and their pads by pressed together on it as the required angles.

Placing other parts and required circular seals on the wheels and fix them in the grooves of

Case parts then coming other accessories.

## **THE ENGINE OUTPUT POWER TYPICAL PERFORMANCE**

As for ( Fig 4/25, 5/25, 6/25, 7/25, 8/25 , 9/25 ,10 /25 and Fig 18/25 ).

1. The engine starts to rotate by a starter motor-accessory fixed near an end side of the engine, by a starter switch for few seconds
2. All the inside parts will rotate, the valves start the work due to the automatic system of controlling the opening a giants each chamber in power unit wheels. Feeding the air-fuel mix, controlled by accelerator of driver pedal and its (idle) working feeding or a bit more; to the certain chamber by opening its valve at the exact time with the programmed mechanism by its pad via connected tapping bar, the air-fuel mix is

compressed in chamber i.e. space over a piston, the continues rotation will make this chamber at a place opposite the spark plug. (a comparison with Otto system !)

*\*(as suction stroke ) ... piston moves downward ..... in (Otto system)\*.*

*{fuel feeding-charging zone }... piston still without move here .... in (Shirwo S.).*

3. The chamber will be filled with pr-compressed air-fuel mix which maintains in pressured situation since the chamber locked by Case wall and piston and radian seal-masses from two sides contacting circular wheel circumference coaxial with Case cavity, as designed radian position of seal masses for each wheel contacting its circular circumference will keep chambers mod in the required closed situation .

When the chamber reaches the spark plug .The air-fuel mix sparks instantaneously by ignition timing distributor. It will explode to a large volume of gases then put off produced gases which need to expand to their natural large volume, but they are in closed chamber, causing high pressure power on surrounded walls and piston. Piston has the flexibility of start moving to be depressed inwardly due to its elastic push-arm connected beneath, to cylinder base, causing stress on this spring in the best typical way due to gasses pressure on piston then depressing it then charging energy to this elastic push-arm, ( the following missions will happen rapidly ).

*\*(firing stroke), piston moves downward, Enthalpy, starting power stroke (Otto )\*.*

*{firing stroke}, piston moves inward , Enthalpy , starting power stroke (Shirwo S.).*

When the piston depresses inwardly, the elastic push-arm will transfer a part of this stress to the cylinder base (wheel side), causing rotation of the wheel, depending on its capacity, the rest of this stress on spring will be stored as constant pressure with charged resistance of the piston push-arm to be used later on aerodynamic reaction of exhaust gases (this is one duty of the elastic push-arm here).

4. As part of reaction caused by push-arm acts on cylinder base on wheel centre-side will push the wheel to rotate by piston displacement as moves inwardly due to combustion gases emission keeping a constant pressure in the chamber , ,

*\*(power stroke) piston moves to constant displacement ...high Enthalpy (Otto )\**

*{power stroke -1<sup>st</sup> power zone)piston in variable displacement, high Enthalpy,(Shirwo S.).*

Since firing stroke is happened and finished when explosion is previously burned all the air-fuel mix and has put off rapidly keeping chamber(s) extent space stand still in high constant pressure without flame before reaching the last exhaust seal mass.

5. Due to this rotation of the wheel, the chamber will cross exhaust seal reaches the opening of enlarging trenches which graded in the same rotation direction. The emission left gases which still in high pressure inside the chamber (as the piston is in depressed situation i.e. inward situation ), will cause additional power effect on its wheel due to the rapid escaping of these gases from the chamber via exhaust pipe.

*\* (exhaust stroke-end power stroke) piston moves up, Enthalpy,.. Power loss,(Otto.)\*  
 {exhaust stroke-2<sup>nd</sup> power zone} piston release, Enthalpy, with exhaust power,  
 (Shirwo S.)*

6. The additional stresses (invisible or indirect) which act positively on wheel are :

1<sup>st</sup> the stored energy of spring (resistance) will attempt to be free causing power on gases (against piston) in chamber and due to circular Case inside-wall (chamber back-wall), and the uniform pressured gas physical characteristic of chamber gas pad (still closed chamber while moving along circular wheel edge zone) that will counters the reaction; this potential force will be reacted positively on piston direction which will provide simultaneously additional continuity power to keep on rotating a wheel same direction.

2<sup>nd</sup> at the time of gases start to penetrate from the graded exhaust opening and due to start losing of gases pressure in a chamber the present compressed elastic push-arm (for piston) which has been already charged inwardly due to fuel explosion in chamber before; will start rapidly to return to it's first position (normal situation) pushing the piston outwardly again, that will push also the remaining gases still not manage to totally penetrate to escape faster, this will cause potential reactions on the wheel by the elastic push-arm reaction to get its release situation , reacts in two direction i.e. on cylinder base means on the wheel and on outwardly piston, (to form additional reaction to rotate the wheel).

3<sup>rd</sup> the locked pressured gases which reach the exhaust zone, start to penetrate via exhaust graded opening and will be discharged fast causing Aerodynamic force to drive the chamber (i.e. cylinder) in a place that all gases manage to escape rapidly

as escaping balloon concept (the flying concept in reverse way e.g. exhaust opening has wings seated in specific effective design and direction), which acts with more reaction on wheel (additional reaction). So:

*\*(upward d. pt.) high Enthalpy, entropy by Body only, power loss (Otto.)\**  
*{release piston}, controlled Enthalpy, entropy degree by Air puffing & Body, caused*

*more effective reaction on power ..... (Shirwo S. ).*

A summation of stresses will effect on the wheel and on this semi-opened position, stresses effect on these parts or near by will be less since the explosion of the air-fuel mix has already finished before in the chamber alone and far from any valve. Same operation will happen with the nearest wheel chamber (by angle radian distance) consecutively and so on the rotation revolution will continue.

7. When the gases manage to escape with the rotation of the wheel, the chamber will reach at the end of the exhaust opening, the pure air puffing valve that opens due to the rotation and tapping of timing bar controlled by side pad against the chamber, to puff a fast pure air, cleaning (scavenging) the chamber from what is left of the gases as exchanging operation (the emission by pure air). To expel these gases before the chamber leaves the exhaust opening totally. This helps in ending the expected tacking due to a remaining carbon optical which may exist after burning the fuel mix. This way of cleaning the chamber by air has a great effect in deducing the pollution of un-oxidised gases. It is helping to treat them while still hot and will minimise the expected production of harmful premier oxide gases. The pressure of this air will exceed while rotation speed increase with adjustment to keep chamber always in a suitable temperature for engine situation by this new procedure.

*\*(suction stroke) piston to downward d. pt. high Enthalpy, stroke & power loss (Otto.)\**

*{natural stage – air puffing on chamber} control of Enthalpy no power loss (Shirwo. S.)*

8. Then the rotation continues for the next stage, to continue for the comparison :

*\*(compression stroke) piston to upward dead pt., Enthalpy, loss power, (Otto & old S.)*

*(feeding -charging zone) control of Enthalpy, no power loss, ....( Shirwo S.).*

9. In increasing the speed of this system, the radian rotation velocity of the wheel would become near to equalise a speed of pistons push-arm depression's velocity (resistance speed reaction), it is theoretical assumption depending on character data of this elastic push-arm, although the high speed will try to balance the wheel

This means the expanding spaces of chambers will be deduced (for the said engine power) by increasing certain speed, a mathematical criteria with fuel feeding rate: speed, depress resistant, dimensions, fuel and of course the loading on the engine will be concluded to reduce fuel feeding at increasing engine speed.

In high speed also, the reaction of the nature's centrifugal power will appear at combustion stage on power zone to act on piston(s)(and its chambers) consecutively as located almost in circumference of a rotating circle, free to be pushed outwardly, by this centrifugal potential opposite power (i.e. piston and combustion gases in the chamber, as mass reaction under Newton law), but due to gas pad in a locket chamber (after combustion happened), and existence of Case circular back wall (chamber back wall); that keeping the chamber in constant radian move maintaining the same constant pressure in the chamber (due to this design and seal places). This pressured gases as gas physical characteristic will reflect as a balloon any power effect on it as opposite reaction of piston to counter it back again on piston(s) , then wheel(s) magnifying fuel combustion reaction on engine. It is meaning of reducing the expanding of chamber in highly speed for the said power, means reducing of engine fuel requirement for the said speed i.e. a criteria for reducing fuel consumption while increasing speed. (Fig 19/25).

**The accessories which help this engine to work are:**

As shown in (Fig. 21/25 & Fig. 22/25),

- A. Cylinder for compressed air, this cylinder should be in a suitable air pressure by the manufacturer before engine start to performance only, then it will be charged automatically by the engine via a compressor which gets its rotation power from the engine itself by a belt which keeps the air in sufficient pressure. It is to discharge air to the main pipe which guarded by a regulator controlled by accelerator-bar from driving cabin which is always in closed status when engine out

of work, electrically. To be opened when ignition starting with the slowly-run (idle) regulator. A device control the pipes outlets one for (air-fuel mix) to get fuel spray for whole power wheel units .Or to a separated fuel spray system for each power wheel unit, by electric control (computer system) from the driver cabin. The other pipe for pure air to be puffed on piston and its chambers at end its exhaust.

- B. The fuel spray system is a mechanical and/or electrical device with a needle valve which uses a simple principle of permitting fast air passing on small outlet opening of fuel to produce spray in this air as required depending on Specific Density of fuel which maintains in supplied by usual fuel pump(mech. or elect.).
- C. The necessary pressured air will increase due to driver paddle-managing system controlling feeding then speed of engine's rotation and torque power.
- D. The other accessories like oil pump and water pump and ignition distributor will rotate with the crank or as for the industrial design.

The overall work of power wheel units (as all) output with a remarkable rotation speed monitoring the ideal output of this engine could be changed not only by depending on increasing fuel discharge-pressure, it could depend also on other engine modifications for separating engine's part performance as auto-output.

### **CONCLUSION :**

The basic design technology of this engine shows a main legend which is to enable to employ the well known physical concepts, those which may inversely proportion with an available factor in any engine, that is the 'speed' to have them in particular combined physical criteria to be utilized for the benefit of the engine output. The design was plant in association to provide practical ways in highly speeds stages to reduce fuel consumption or to increase the power or acceleration by a said fuel. Also to be able to conduct the engine by independent controlling device to feed the engine (there is no relation with engine activity), although the engine could supply indirect power resource as to assist this device to work (i.e. by a conversion belt). Also it provides ability of independent conducting for each combustion intensity inside the engine without influencing on the others, even on services (oil, cooling). It introduces a unique way in conducting this engine which utilizes legends of the physical concepts connected with the circular motion the of bodies, by using the Kinetic energies and its benefit to overcome



the high rate lost of valuable fuel energy in all the present advanced automotive engines and finally in actual use of computer.

1- This engine depends on many elements constructing its performance, fundamental physical concepts of dynamics, elastic characteristic of material, the best way of utilizing fuel combustion and the best workable mechanical sliding design, these elements are put to work in association to produce better fuel utility output.

a- The cylinder(s) has flexible piston, mounted in each wheel on the center-side of wheel axis with central line angle ( $> 45^\circ$ ) on its wheel tangent i.e. larger than  $45^\circ$ , a certain force on piston will urge it to deform and transfer part of this force to the wheel then acting like sway pocket to rotate this wheel due to moment resultant.

b- The air-fuel mixture charged in pressured mode or in supercharging mode.

c- The mixture charge will explode by timing spark plug, nothing will prevent this.

d- The piston is placed in a plant position against the spark plug at ignition timing.

e- There is one wall in the chamber has ability to move if urged by a force, that is the piston, to start to depress guiding explosion charge impact to be driven on it.

f- The flexible piston in the cylinder is affixed by elastic compression push-arm (ductile spring) on cylinder base, any force impact or increasing it on this piston will cause the piston to depress to inner ward due to the elastic deflection of its elastic compression device connected with. It is by Hook's law of elasticity that means the displacement characteristic is proportional to its force in a straight linear mode. Part of this acting force on piston will transfer to the cylinder base via push-arm causing this wheel to rotate as has sliding periphery edges. This magnitude is in a plant design considering Modulus of Elasticity for push-arm.

g- The wheel will rotate sliding the chamber's emission contents to exhaust zone.

h- The principle used here is the same used for explosion concept inside a canon to through a bomb and how to re-fill automatic weapons by its emission's gases.

The displacements of these pistons are in different magnitude depending on each explosion charge occurred in their chambers since each piston's elastic push-arm playing a major part in the performance of this system, that is to provide the actual spacing on chambers relatively to the actual required work to be done by the engine in order to reduce the fuel consumption to be according to the exact needs of work.

Modulus of elasticity for each push-arm will play this major part in this system by using different magnitudes in each option even in one push-arm e.g. starting its top ( beneath the piston directly) in a sensitive elasticity to let any primer increase of a chamber(s) under pressure (the air-fuel mixture at explosion) to effect on its piston to guide the primer impact to be directed then to drive the whole explosion impact at the piston(s).

This is a similar to that old concept still used in fabricating cylindrical gun canons.

The magnitude of modulus of elasticity for a push-arm may be changed gradually directed to the inner ward i.e. to cylinder base as plant, to increase the resistance in a design connected with the whole engine features, by using different cross sections in ductile spring under pistons; to let more effective impact on cylinder base then to on the wheel(s) then producing moment (or as momentum) for rotation.

That is explained way the cylinders in this engine have more related lengths .

The pistons will work harmonically inside the engine due to their freely way of fixing them inside wheels with independent conducting feeding supply. This is regarding an important physical concept (a rotating object will need less power to keep on in its dynamic move or even if accelerating it than that primer power used first to change its static to dynamic mode as a relation proportioned inversely with its rotation speed ) .

This in considering all data, type of fuel, and situation of engine in various loads.

2- For the interrogation on how the aerodynamic effect is existing from exhaust gases by using specific outlet opening .

### ***It is by applying that fundamental concept of (Bernoulli's principle) and escaping balloon***

Concept as essentially used to produce aerodynamic force in any rocket !.

The chamber(s) in the wheel is to be assumed as a rocket's chamber that contains pressured gases emissions (from fuel burnt ) to expel from a rocket back side via a designed outlet (opening). This would be guarded be wings to change diameter or the angler direction of this opening to effect on escaping gases to control speed or direction of such a rocket , e.g. (same control has been used in advanced Jet Fighter).

The same thing is applied (relatively) on graded specific exhaust openings fixed on the Case around the wheels periphery at starting exhaust portions of this engine.

That is to construct affixed wings (or moveable by control) on the Case periphery around the wheels at a starting of exhaust zone to inverse the aerodynamic effect.

These out lets which shaped by fixed wings will utilizes the exhaust energy power.

Since chamber(s) in this rotating wheel is containing pressured gases due to previous explosion of air-fuel mixture (occurred before by spark) besides existence of Back Off force from the depressed (mode) elastic spring which is fixed beneath the piston to react, but in dual opposite directions; on piston and cylinder base in the wheel to react also when chamber pressure starts to reduce at gas penetration.

The place of these openings in Case starting where exhaust gases are free to expel.

The openings orifices, angles, (wings shapes) and the places all will subjected to a plant aerodynamic design to act intensively at the exhaust zone outlets considering all other data e.g. the dimensions cylinder, the wheel, back off elastic springs , the fuel mixture compression ratio with the whole engine design and its loading.

The chamber structure will be under escaping balloon concept same that used for a Rocket; to reflect then to act on its rotating wheel to add more power, more torque on engine output freely since the design provides this unique ability.

This explained how the aerodynamic force of the exhaust gases could be utilized to add more power over the conventional fuel combustion power on output directly.

The simplest example is a Rolling Fire-Works Wheel which rotates by reactions of lighting these Fire Works mounted on the wheel periphery on expelling gases, by using this principle.

Exhaust central outlets placed to face the chambers and to be under the effect of aerodynamic exhaust gases, when expelled from the chambers by a design starting (on a rotating direction) by a small opening of sharp designed angle on its wheel tangent on the inner wall of wheel.

Case then followed by others in plant distances with gradually increasing in their dimensions and/or in a tangent angle around the wheel periphery, in the beginning of exhaust zone; to have actual dual effect:

First, on increasing the speed of expelled gases (via small holes) to produce reflecting aerodynamic force acting positively on wheel. While changing the direction effect during the wheel rotation by positions change of outlet holes and angles.

As to inverse a centrifugal turbine principle, when there is rotating periphery has plant wings surrounding its inner space with a pressured air comes via a pipe to be urged to be driven outwardly in diagonal certain direction crossing these wings.

The fast air will act on these wings while discharging out; aerodynamically forcing the wings to move rotating the whole periphery on the same direction !.

How about these wings are in affixed periphery as the Case of this engine, and the puffing device is able to rotate by a reaction, then it will rotate, same as the inner freely rotating wheel, containing chamber(s) of exhaust pressured gases urged to expel but aerodynamically to force the wheel to rotate.

How specific is this movement? That is depending on how to exist and invest this natural phenomena in a design subjected to connect the whole mathematics calculations of the above mentioned data ( by using computer formatting programs ! ) .

3- The interrogation about the engine performance as combination of piston, rotary and turbine with additional influence of physical positive effect due to movement of elements inside the engine. This design includes fundamental physical concept those which used in inversely proportion with an available factor in any engine that is the 'speed' to have some Kinetic energies acting in a particular combined physical criteria to be utilized for the benefit of the engine output depending on conducting way of this system.

By employing Newton's Laws of Motion, Gravitation and Centrifugal concepts to be implemented in this engine design same as used in astronomy's legends.

The piston and its chamber (actual piston cup mass) are placed in the open side of a cylinder in the wheel(s) near the circumference. This cylinder(s) is placed in a position to have an axis making a wide angle with its wheel tangent to let a use of centrifugal influence to employ its resultant effectively by choosing an angle larger than 45 degree.

The piston(s) will be under the effect of combustion force rotating the wheel, in the same time at high speed to be assumed as an attraction force on the piston(s) which is moving in this circular zone of wheel(s) periphery directing to its central axis, while the elastic push- arm beneath piston(s) urging to push it outwardly by transferring the centrifugal effect of the wheel fast rotating on the objects placed on its circular zone.

The rotation speed producing this centrifugal effect which is as known will proportion

inversely with the opposite force as it is here the combustion force (attraction force to the inner zone ) on piston(s) which is consecutively occurred in the chamber(s).

The force of pressured emission will laterally reflect any force acting outwardly on its flexible piston according to the concept of how pressured balloon could reflect a force ( gas elasticity) back on the same direction i.e. on the piston again. But since each chamber(s) is mounted on center-side place of the wheel the final resultant will act on the wheel rotation by accessing additional moment on it. As the angle of the cylinder is considered.

That means also the actual expansion of chamber space will be deducted besides that concept of urging to balance the positions (as flexible) for all bodies which are mounted on opposite direction round a wheel in fast rotation, although there will be a certain force to keep the wheel in rotation but as minimum as required. This means a deduction in said required internal combustion force in highly speeds or a rapid acceleration i.e. deduction in fuel consumption as if compared by the conventional systems . How to use this combined physical criteria, is by substituting relevant determined data of the engine design and specification of fuel used to built the mathematical equations to observe practically the certain magnitude rate of magnifying the fuel energy on the output of the engine for a said fuel by physically utilizing specific movements of elements inside this system as declared above.

However a perfect fuel power output occurs practically due to longer moment (momentum) effect of pistons with wide torque effective angle on the crank( could be more than  $180^{\circ}$  ).

#### **Analyzing the elements and the reactions :**

After the instance of fuel combustion in this mechanical design and according to direct the powers occur simultaneously at fuel combustion in this discipline which employed natural physical concept powers to happen due to the particular places of chambers and by utilization physical characteristic advantage of gases under pressure in chambers those result due to fuel combustion, reactions appeared as:

- A- The pressured gases impact on piston, the power reaction of elastic flexible push-arm, would act on two ways. A part pressing the wheel to rotate, and a part acts to get back to its previous mod at the piston top point (upward dead point), as it is elastic push-

arm that will be stayed in charge beneath the piston, due to chamber's combustion gases. It is the gas physical characteristic in a closed space, which will resist any force as gas elastic resistance to reverses (reflect) this reaction appositely, which will be back again on piston and since the back side of chamber is the Case circular wall (internal circumference of circular case cavity), which provides away for keeping it rotating smoothly (on constant fixed axis), keeping chambers in locket situation by the radian seals job, while the wheel rotates means keeping a lock chamber in power zone with constant pressure. This means keeping the longer impact effect of this power on Crank. This is the hydraulic reactions of chamber gases inside this engine & the spherical shape advantage in utilizing the chamber pressured gas pad characteristics in this situation by consecutively investing of all physical powers effects happen inside this system to be concentrated on the chambers to be used positively on engine.

- B- A losing of pressure due to gases penetration as gases start to penetrate when wheel chamber reaches the exhaust opening, will agitate the elastic strained piston push-arm (in static mode but depressed situation ) attending to return back rapidly to its normal position, it reacts on two opposite directions (dual sides), meaning on wheel and chamber gases to add more power on wheel for torque..
- C- After the continuity of wheel movement and those powers effect, a new physical power happens after this instance due to the way of exhaust wings opening's design. That allows the under-pressured gases to extend partially then totally penetrating in away to get their fast best position of escaping from chamber. With the advantage of existing access power from the piston push-arm resistant being under press that attend to return to its normal (first) position. A Physical power which is the Aerodynamic that forces the chamber to be at the right directed portion while gases escaping. Which will cause additional rotating power on the cylinder i.e. wheel to rotate depending on its place and on the exhaust opening place in this design. By the meaning of escaping balloon principle used here in this analysis. It produces aerodynamic power by using the effect of air speed concept (as flying concept put in a reverse way of reaction analysis).

D- In increasing of the engine speed (i.e. revolution speed) physical powers will appear, instantaneously at the time of combustion and increased consecutively, with influences on the piston (chambers) performance and will effect in two ways.

First , each piston which produces linear force to accelerate a revolution of a circular body (the wheel), which is mounted therein. This will be under a physical effect depending on speed factor, due to this design. The reaction force to accelerate the wheel revolution which is the linear depressing of the piston inside a wheel will be reduced linearly since it could move freely due to its push-arm. That is the more speed in revolution does not need the same primer impact of linear force reacting all the time to keep the wheel revolution in a constant high speed or to accelerate. This means a particular consecutive reduction in potential power of the piston (i.e. the fuel combustion needs) during highly speed, that will be required to produce these impact powers consecutively on wheel. This means the said fuel demand for highly speed situations of engine, could be reduced rapidly while reaching highly speeds and so on. This with other criteria concerning the distance of push-arm depressing formula against the combustion force. A relation to the wheel revolution speed and the decreasing of linear movement of the pistons while increasing this speed, which may reach to the minimum reciprocated linear force effect situation(minimum piston displacement) on the wheel in the highest speed . A physical concept implemented here on wheel's rotary dynamic speed and its acceleration and the linear (piston) force effect consecutively, to reduce these reactions due to speed effect in highly speed.

The other effect, is by using the physical concept of how a space-ship is escaping from earth-gravity i.e. a technique which allows a space-ship fly free from Earth Gravity intensity zone by employing the centrifugal concept. This system employed this concept also inside the engine in a very small sample but in inversely reaction, by countering this force. The piston cup(piston top and gases mass in the chamber) is to be assumed as a mass with free movement under the effect of speedy circular circumference zone (as a space-ship and the wheel as earth while increasing its speed). The more speed, the more force to let these masses try to escape from its central gravity in consequence reactions, the under-pressure gases happened

instantaneously after fuel combustion in chambers will counter these reactions since the pressured gases in a closed space ( the chamber) will reflect this outwardly centrifugal effect reacted from the piston back again to the wheel via the piston face itself by the gas physical characteristic being under pressure in the chamber(s) in a closed space to act like a balloon for reflecting any reaction, back on wheel which is the only free to rotate more as pivoted on crank of engine, adding this additional power to act positively on wheel again. All these influences connected with the physical centrifugal concept employed here. Even the distribution of pistons in wheels and achieving the balanced positions of pistons at highly speed would be considered. These reactions appeared due to employing physical concepts related with the circular shapes of members used in the discipline of this system, the resultant would be called as additional *spherically speed sustained* reaction on the engine (Fig 18/25).

The mathematics analysis for all mentioned concepts could be achieved easily.

A computer formatting conclusions on calculations for a piston weight, a wheel diameter, type of piston push-arm resistance, fuel output, the design and kind of application, the reduced spaces at various speeds; in achieving the required dimensions for each option. The graphical indicator diagram analyzing deduction of chamber expansion at various speeds and its exact fuel need for the smallest extent chamber space to be achieved then using advanced controlling system e.g. a computer to observe these potential effects with relation to each options to connect with a feeding device to reduce actual fuel consumption at highly speeds.

These potential effects are still neglected and lost in the conventional systems.

But here is the practical advanced way of reducing the fuel consumption in highly speeds by using physical criteria in such designed power system to use it !.

**IN GLOSSARY** (Philosophy of utilizing Physical Centrifugal technique) (Fig 18/25):



This system is utilizing a theory, which used in charging water or air e.g. any liquid by a concept of a "Centrifugal Pump or centrifugal compressor" rotates by automotive power resource supplied from outside.

Using the same theory for this design but in a counter way of reaction. Since the liquid used here inside is replaced by a specific one containing potential energy, an easily analyzed chemical energy liquid, that is the air-fuel mixture. The air-fuel mixture is being used first in this discipline, in order to produce a chemical energy force inside the system to supply the automotive power requirement, causing the energy to act in a way as to make it rotates by an inside automotive power source. Then, using the physical reactions shown in this discipline (which is similar to centrifugal pump, due to speed reactions on a mass located on a circular zone), to act on pistons-cup (i.e. mass of piston and combustion emission of expanded gases in chambers), which seated to be under this influence freely to be effected to be driven outwardly consecutively in the meaning of reducing the linear displacement of piston due to fuel combustion without losing its impact on the wheel, as relatively to their particular place on circular zone in this system. This influence will react in a reverse direction in this discipline due to emission of pressured gas pad in chambers to act as elastic resistance as a balloon of gas in the chambers upon pistons to counter this influence to act back again on pistons which are already pushing their wheel(s) to rotate to be as physical additional resultant acting positively on pistons, i.e. engine consecutively at highly speeds. In the meaning of using this new principle of centrifugal concept employed in automotive power discipline for the benefit of increasing engine output by using the reflection of inside centrifugal reaction, to use these as a criteria to increase output power of a said fuel or to increase acceleration rapidly or to reduce the said consumption in this integral engine system.

These invisible(or indirect) physical influenced reactions in additional to the exhaust physical aerodynamic effecting on combustion intensities are due to advantages of circular rotation on bodies and its outcome physical utilization in this system may be called as

*( The spherically sustained reactions ).*

**SPECIFIC PROPOSALS :**

1. Light solid alloys for power wheel unit might be reinforced by a hard solid alloy in high torque stress places (i.e. crank-wheel hole, middle panel of wheel between the cylinders, cylinder bases and modified wheel anti-scratch circumference ).
2. Light solid alloys for the piston's disk as the specific industrial requirements.
3. The push-arm elastic compression resistance capability for piston must depend on type of engine output, acceleration, speed, application, type of design, fuel, etc. The flexible elastic system, which may be a metal spring or hydraulic elastic compression system could be used with the heat resistant seals similar to that used in the weapon industries for automatic fast canon refill system. The compression metal spring could be in differential cross section diameter as to start small from the top then increase within a plant design to let it bear the various stages for different power ranges. This can be done regarding the shape design of the ductile spring
4. For radian gas seal mass: could use a self-lubricated Graphite(carbon) alloy or hard specific metal alloy with special lubrication system in the engine case using the advantage of one direction wheel rotation with special trenches and holes. Or, one could use a specific plastic solid compound material with anti-heat characteristic, the type, shapes and sizes might be varied from different industrial resources, for minimum sufficient contact. One could use three types of seal mass, for anti air penetration, Or one could use couple of seals for two-way effect i.e. opposite lock reaction in one seal mass unit. Wangle seal could be used in each seal mass unit i.e. not in rotary part here but in the case that provides more efficiency and workability since they will be used in a fixed place acting on a fixed axis maintaining a constant axial position for contacting wheel circumference surfaces which fixed on one constant axis in this system (not parabolic rotation).
5. The big circular seals between Case and wheel for sliding and anti-penetration are of two, three or more stainless steel ring bladder inter-lock gathered as a slide bearing ring device or as required by the industry. This could be done by a special wheel's edges with sharp design to inter lock with engine Case ,a specific technique as required to reserve the mod on wheel depending on design proposals . (Fig 2/25 & 3/25).
6. Oil, gas ring seals in pistons using specified required alloys.

7. The oil pads are of light aluminum circular plate alloy with special radius grooves for oil cooling with smooth hard specified alloy edge for controlling timing of valves-bars with chambers positions, the timing control for the two valves in one pad or each in a pad. The timing depends on the design data and other requirements.
8. Oil is used for lubrication & cooling the power wheel units. This oil could be cooled by water or air cooling sub-system in the engine case or outside the engine.
9. The distributions of oil and cooling water grooves in the Case are as for industrial design of the Case to cool the engine returning oil in the Case and the engine.

#### **USEFUL INDUSTRIAL & COMMERCIAL CHARACTERISTICS :**

1. A simple easy way to manufacture with less components parts for the final products.
2. High output related to the size and cost, a system contains pistons with rotary operation using exhaust, aerodynamic and other potential power advantages.
3. Using a new principle in charging the air-fuel mixture to the chambers, pre-compressed air-fuel mixture, from outside adding any pressure needed for the required performance, rather than the old principles of sucking the air-fuel mixture to the chamber and compressing it to be in pressured situation by the same piston whereby losing power stroke and energy and relative slow acceleration . This means using of a jet technique in charging fuel, in this design which will give high performance as fast and better fuel burning as needed by fast acceleration engine without limits related to other specifications.
4. The pistons in this engine connected with a relevant free flexible push-arm working as elastic resistance, using various resistant types depending on the engine design. The power data occurs in the chamber at firing stroke, (types depending on fuel and design). This characteristic will apply good specifications, one being the reduction of sudden impact and the uniform stress of high power on any piston(s). The push-arms will transfer stresses of pistons uniformly on the Crank making the engine run more smoothly, reducing vibration. The elastic flexible piston depressing will allow a good flame propagation (as combustion chamber space is automatically controlled), and will prevent detonation in chambers.

The heat energy advantage (if used) would tighten the flexible push-arm of pistons with heat increases in heat (especially in using a gas or hydraulic resistance, which could reduce the elastic movement of pistons (increasing the resistance). This means reducing the sufficient capacity of charging air-fuel mix for the same output later with the continuation of working time. This special design will agitate (at fuel combustion) these physical nature's powers to appear in a situation could magnify fuel output to be in the best potential power related with speed in this engine.

5. The main oil services depends on a natural constant principal with a special design that the oil flow will increase with the speed increase naturally not mechanically (as for conventional engines). This will be done by a centrifugal concept depending on the pads designed groove by feeding from central tunnel in Crank via relevant holes with relation to its distance from oil tank in engine. Magnified with speed increase, cooling the wheels and disposing pistons oil. This characteristic will lead to use the far pad in crank as huge oil pump by using high hydraulic specific grooves(trenches), for sucking oil from Crank to supply oil in Case for those seal masses needs and to cool Case in a best way. The usual oil pump could be cancelled if the oil tunnels in the case terminate at feeding (middle) oil tank of the central canal. The central canal in crank would not effect on the actual moment of inertia of the crank as its cross section is always circular.
6. The pistons with their free flexible arms will reduce the reciprocated movement to minimize it decreasingly (the distance between upper and lower piston's dead points); due to increasing of engine speed, in this design. This matter reduces displacements of main engine parts (pistons) movement while increasing speed, (not in constant displacement at high speed as in conventional system!) by implementing physical concept related to a spherical rotating in speed and accelerating by reaction of linear forces effects on it. The reduction of push-arm depressing distance with wheel speed increasing due to engine speed would lead to theoretical assumption of a minimum movement in the very fast speed. It is a physical criteria of the consecutive reducing in chamber's expanding space for fuel at explosion and the way of this characteristic transferred by the same emission gases in chambers to reverse it to act positively on engine output.

It is one of Mighty God miracles in creating the very huge Space Universe and the little knowledge of man on that , one of what's concerning the spherical shape bodies, that is the centrifugal concept , man is trying to use this concept in reducing (said)fuel consumption in his very little engine, while increasing speed, as the most pioneer characteristic to be utilized by using advanced accessories.

7. This engine system does not contain those valves that used in the old engines with their timing articulated connecting system, (camshaft, gear, pinion.. etc.) Those things are not existing in this system i.e. canceling their weight, noises and expected air smoke related with any of their defect also canceling their problems of failure that may happen in high speed.
8. The air-fuel mixture quality can be controlled easily in this engine from out side accessories, in two ways by controlling the supplying pressure and also by controlling the fuel mixture, or both together depending on design data, however the system may not require a same(ideal) uniform fuel compression ratio in all its chambers or in all of its working stages, since independent pistons performance characteristic with their ability of various displacements providing flexibility in the engine to make this system easily uses different types of fuel efficiency, any gasoline(Benzene)octane, or Jet gasoline or even Gas fuel could be used after reconsidering the mixture accessories requirements for charging these fuel.
9. Cooling chambers and expelling exhaust gases out of it by puffing air (scavenging) directly on it at the end of exhaust stroke. This will control the heat of piston cup and supplying perfect adiabatic efficiency of air cooling technology for pistons in addition to the wheel side-walls oil cooling & enthalpy of cylinder walls. The air also will prevent the remaining of after burning carbon (soot) and will complete to oxidize unburned carbon oxide gases i.e. (CO) directly to (CO<sub>2</sub>)or (H<sub>2</sub>O), same to complete oxidization for the sensitive nitrite oxides (NO<sub>x</sub>), (and SO -if exist). This a practical way for anti-pollution treatment technology inside engine, in a way to help conserving the environment and to prevent occurrence of harmful acid rain in industrial territories, all these missions could be under a perfect control. When there is no sufficient time to complete expelling exhaust gases of a chamber\* in a highly

speed, it is possible to make this mission repeated for each twice revolution of this chamber, by having a management(as this system permits for that ) to make the fuel feeding for it\* to be for each double revolutions consequently & harmonically .

10. There is a perfect way in lubricating the pistons that only the moving one will be lubricated when it needs to. Each piston has it's own private oil pump, and the lubrication system designed in away to reduce too much the pollution of air-oil smoke, since no crank case-oil sump bellow the pistons, however a leakage gas affliction will not cause oil smoke as much as old system does; if this happen.

There would be an air pad(s) under the piston(s) that could use its advantage in a special piston design to maintain a sufficient pressure in high temperature beneath piston to use it to be utilized ....for longer seals maintenance period and for output.

This way could be connected for dual piston effect in one wheel.

11. The distribution of piston (cylinder) angles in the central crank in the engine will not need a balance weight These are not required in this engine system. The way of emission gases exhaust rapidly with the circular rotation's direction will minimize the stress on stroke final seal masses and helping a good lubrication mission for all seals.
12. This is a specific design in distributing pistons with its unique way of piston free movements while rotating the Crank (torque crank shaft). The principle used here will not need to distribute the stress for every combustion (piston) unit, as for old regular engines in all working time. That happened in the old system which all connected with a zeg-zag crank shaft; each one with its special angle in slipping point guarded with metal bearing pads. Meaning all the combustion pistons will move consecutively (mutual) side by side equal, in the cylinders due to the rotation of the crank shaft, all the time, this increase with speed acceleration causing more friction, heat and vibrations, more lubrication need, which all affect on the engine efficiency. This new system is not working on that old principal, it reduces piston(s) movement in a counter way with the increasing of speed, due to physical concept implemented on this discipline, to reduce speed effects on engine, even it can reduce the fuel consumption in highly speed using advanced controller systems

depending on the criteria of rotary wheels and their pistons harmonic linear movement and its performance on certain speeds & applications.

13. The best seen characteristic for this engine is the multi-output powers which can be changed in various ranges not as by depending on the revolution speeds of the engine but on the required movement of the working pistons inside the engine (automatic power parts output). Like for example all piston in used supplying 100% output of the engine for heavy work in vehicle engine(4x4 wheel in work), or 2/3 or less parts in used for high speed or 1/3 or less parts in used for just to keep the engine in Idle working situation. This could be done in away that even its oil services could be stopped by controlling their relevant pads centrifugal outlets.

This characteristic is very useful: in reducing actual fuel consumption, reducing pollution & providing longer maintenance. This new engine can be produced as engine for every work (as multi-purposes) in one equipment(i.e. one vehicle) which is automatically suits various ranges of outputs requirements, without effecting on unused parts or causes tough vibration,(i.e. automatic output engine) as for different requirements on horse Powers e.g. excellent use for automatic demand for 4x4/ AWD.

SHIRWO + Automatic Need auto engine will be called (SHIRWAN) SYSTEM {S.H.I.R.W. Automatic Need = SHIRWAN for automatic-power-output engine }.

The heavy transmission gear complex in this engine could be minimized or even terminated but of course keeping the reverse position available .

14. Since there is the ability of stopping piston's movement in this design while crank continues in its rotation plus the circular slice machinery. The engine could be combined

with an electric power engine mounted on the same crank or by clutch as advanced engine design with very practical use, it is a fuel combustion engine with electric power

engine in one unit set . Depending on the simplicity of this design which can charge an

electric battery when the combustion engine working. The electric power engine could

be used directly instead – if it will be required when a situation needs i.e. a crowded  
city, to reduce the pollution. This is a piston - electric output ( combustion - electric )  
in  
one combined engine unit.

15. In addition to other characteristics, proposals and options which can be obtained in industrial laboratories this machine will fill the gap between the normal piston combustion engine, and the turbine Jet engine using their-all-good characteristics together in one engine unit, it will use the good characteristics of combustion piston (and rotary) engine in economic fuel consumption, slow rotation speed if required, small engine and easy to manufacture and maintenance, with the Jet characteristics of high power, high accelerated speed if required also by using the aerodynamic power of exhaust gases with other physical potential powers; all in this integral design and cheap engine.

16. This design will open the wide gate for the computer participation in controlling all engine activities and its characteristics performance by using advanced controlling accessories with economic industrial influence in the age of computer.

17. This engine could work in a vertical direction engine related to the torque crank since most of engine oil services depend on centrifugal concept related on speed.

Its important characteristics and the ways of reducing(decreasing) fuel consumption rapidly with high speed increase, this will lead to use it mainly in high speed equipment that needs less reciprocating piston movements which makes it very qualified engines for Hoover Craft or flying equipment.

More advanced research on it will continue, for example computer formatting ready programs and the use of advanced Laser ignition could be used .

18. The variety of design options on this system could be implied easily since the main

elastic parts of this system could be used from the variety of elastic devices springs

or

hydraulics used in the automatic re-fill emission weapons, those various machine-guns,



the fast-canon, i.e. those weapons industries could participate practically indeed by  
a  
good part of their products in supplying main parts of these engines, to start  
changing  
those industries for man's civil and peace purposes ! .

#### **DESIGN PROPOSALS AND OTHER OPTIONS :**

1. This engine could contain many power wheel units depending on the out put torque power, with a relation to the diameter and number of cylinders in each wheel, the various proposals and options of this system provide extensive use .
2. The power wheel units could be in different diameters for kinds of engines, the principle of piston's moment effect on the Crank will be considered in related to output power using the required wheel and cylinder diameter in any engine design as these are some engine options. (Fig 2/25)
3. Double ignition systems (accessories) in one large (super) power wheel unite, one or more in an engine, could be used as some engine options. (Fig 24/25)
4. The main canal(tunnel) for oil supply in the crank could be seated out side the crank. A longitudinal tunnel connected parts on the crank as a canal across all parts (that stickmen together), parallel to the crank line as its boundary, with holes for each part, for oil feeding, considering the main intake and parts balance. The oil supplied for radian seals by specific tunnels in the case via modified pad.
5. The water could be used for cooling power wheel units by a specific design for Case with more extensions between the wheel units containing canals for water, or using air cooling system, as these are some options .
6. The difference of cylinder number in a wheel depends on the diameter and speedy output power of the engine as these are some options, (Fig 14/25, 24/25).
7. The cylinders in each power wheel unit in the same engine could be in various diameters as a specific in each wheel with relevant accessories as required for Automatic power engine, as options of Auto-Engine, (Fig 15/25).

8. The fuel spray system can be in one set for all air-fuel mix by a pre-mixed fuel feeding the valves, or could be separated pipes control for each power wheel units in the engine, controlled by advanced computer system, as required for Auto-power engine .They could be substituted by a direct fuel mixture injection on each chamber by additional Case fixed device for each wheel. (Fig 21/25, 22/25).
9. The fuel spray system could be controlled by a computer system to monitor the required spray mixture with air and could vary this mix for each type of gasoline octane by automatic device as required for multi -purpose Auto-Engine .
10. The use of different wheel data in one engine; with specific relevant accessories as required with automatic control for varieties in output range. This is the automatic multiple power engine, Automatic Engine (i.e. Shirwan engine).
11. The places and numbers of the radian Case seals can be changed depending on the design data and type of application depending on the industrial production.
12. The exhaust opening could be in different grade openings and angles related to engine design and fuel criteria and could be in mechanically changeable design for wings grades and directions by a mechanical device control.

The exhaust opening could be in opposite direction depending on Case design.

13. The flexible (elastic) system of piston push-arms could be in various types for different engine design (or even with differential diameter along one spring) using metal spring, gas or oil hydraulic device - heat resistance - like those used in automatic gun weapons, it might be more tight and qualified by heat increase !.
14. An advanced new modified system under the name of (connected hydraulic wheel unite system) could be used, that can get use of the impact power on a piston at firing stroke instantaneously to transfer a part of this power to effect on the opposite direction piston in the same wheel at a position when its combustion gases (of the previous piston) start to expel from exhaust opening. In a way to supply impact force from inside the cylinder to push piston outwardly faster for rapid expelling of those gases out of the chamber. Accelerating them to be released faster from the aerodynamic graded opening, producing more

reaction on the opposite direction on the wheel increasing the turbine power. This is a technique of a connecting hydraulic system of two pistons. It could be working also between the spaces beneath pistons in one wheel. It is advanced modified option to be as a part of the development researches on this system. (Fig 12/25).

15. The central oil canal in the crank would not effect on the moment of inertia of circular cross section crank, as this depends on the size, diameter and metal capability of torque resistance of Crank related to its canal diameter. The usual oil pump could be cancelled in a design that could make oil tunnels in Case driving oil to the middle oil feeder tank that feeding central oil tunnel in the engine crank.
16. The mechanical ignitions distribution could be in advanced electric device. It might need also additional timing device as for old system but with more simple method, and even could use clever computerized device or (Laser) due to the fast rotation of the engine as a part of advanced developments on this system.
17. The metal industry for alloys, the grooves and tunnels could be easily done with the facilities of metal casting, and drillings available in recent manufacturers.
18. This engine could be designed in a vertical crank(shaft) direction on the same system principal. It is because of most oil services are depending on the centrifugal energy which could work in any direction, the engine oil pump could be cancelled. This means it could be easily used for flying equipment or Hoover craft regarding the simplicity, the speedy efficiency, the output power and the small size. this promising generation of clever engines could be used for advanced small Hoover craft (or a composite vehicle as Automobile and Hoover Craft or running and flying transportation equipment) by implying this cheap system with using of recent available advanced computer control,

( Fig. 23/25 ).